power supply line 8 is not completely disconnected. Therefore, even if a comparatively large electric load is cut off, the power generation control of the alternator 1 is not erroneously responded and an unwanted drop of the output voltage can be prevented.

Moreover, when a connection failure occurs in the power supply line 8, the output of the alternator 1 is controlled, and generation of high voltage pulse applied to the power Zener diode forming the full-wave rectifier 4 is controlled. The temperature rise of the power Zener diode can also be controlled effectively and thereby thermal breakdown can be prevented.

The reverse withstand voltage of the power Zener diode can be thermally designed to have sufficient strength even for the condition to instantaneously generate a no-load saturation voltage of the alternator 1, by cutting off the rated load in the maximum allowable number of rotations of the alternator 1, namely by electrically cutting off the battery 2 and electric load 21, during power generation.

Even in the condition where the output terminal is completely disconnected, for example, the power supply line 8 and a fusible link 23 inserted in series to the power supply line 8 are disconnected (this condition is called the "perfect B disconnection"), the power transistor 61 for controlling a field current is quickly turned off. Thereby, an energizing circuit such as the field winding 5 or the like can be protected. Moreover, the alternator 1 can be protected from breakdown so that a high voltage pulse generated in the generator output can

be absorbed by the power Zener diode.

In the condition that an electric load 22 connected directly to the power supply line 8 without via the fusible link 23 exists, perfect B disconnection occurs. Therefore, even if a comparatively high voltage pulse is generated once, the output control of the alternator 1 is not executed. Accordingly, the power can be supplied to the electric load 22 connected directly to the power supply line 8 without any drop of the output voltage.

Further, an adequate measure can be taken even when the full-wave rectifier 4 is usually formed using the power Zener diode of a lower withstand voltage by discriminating the high voltage pulse generated with cutting off condition of the load from the high voltage pulse generated when a failure occurs. Thereby, an unwanted drop of the output voltage for ordinary cut-off of load when the high voltage detection level is lowered can be prevented to cover reduction of the withstand voltage of the power Zener diode. Such reduction of the withstand voltage realizes a reduction in the cost of the charging system of the vehicle because the noise appearing on the power supply line 8 can be absorbed, radiated noise can be reduced and the withstand voltage of the alternator 1 can also be lowered.

High voltage pulses generated in an irregular manner with the short period can be detected accurately and temperature rise of power Zener diode can effectively be controlled quickly to prevent thermal breakdown by comparing, when a connection failure in which the power supply line 8 is perfectly disconnected, the accumulated period of the high voltage pulses

generated frequently with the allowable application period of the power Zener diode.

In addition, in view of eliminating influence on the voltage control operation of ripples and switching noises, the voltage signal having passed the high frequency noise filter circuit 64 is inputted to the high voltage pulse detecting circuit 83 as another control system different from the regulated voltage control system. Thereby, since the allowable period of the high voltage pulse is discriminated depending on the accumulated period of the high voltage pulse, any delay is generated in the process of the regulated voltage control system. Therefore, when the high voltage pulse is generated, the power transistor 61 can be turned off quickly and any adverse effect is not caused in the regulated voltage control operation.

Moreover, if the high voltage pulses are generated repeatedly and the accumulated period thereof exceeds the allowable application period of the power Zener diode, the output of the alternator 1 is controlled and thereby generation of a high voltage pulse can also be controlled. Upon completion of the output control of the alternator 1, a reset pulse is generated and the data such as accumulated period of the high voltage pulse and the count number of the pulse counting circuit 173 are reset. Accordingly, if the high voltage pulses are generated repeatedly, detection of the high voltage pulse and control of the power generating operation are repeatedly conducted and progress of damage at the connection failure region of the power supply line 8 can be delayed. Furthermore, since changes for generation of